CLAIMS

Claim 1. A DC offset compensation system for a direct conversion receiver, comprising:

an incoming radio frequency signal;

a local oscillator (LO) generating a local oscillator signal with a frequency equal to that of said incoming frequency signal;

at least one mixer to mix said radio frequency signal with said local oscillator signal to generate a zero frequency intermediate frequency (IF) signal;

a double sampling means having a calibration phase and a signal flow phase, wherein a compensation signal is generated and stored during the calibration phase, and said IF signal is processed during the signal flow phase;

means to generate and store any DC offset of said IF signal as the compensating signal during the calibration phase; and

means to insert said compensating signal in said IF signal to cancel the DC offset of said IF signal during the signal flow phase.

Claim 2. The DC offset compensation system as described in claim 1, wherein said compensation signal is generated by applying a calibration signal to derive said compensating signal and storing said compensating signal across a capacitor.

Claim 3. The DC offset compensation system as described in claim 2,

wherein said compensating signal is derived by applying said calibrating signal to the non-inverting input terminal of an operational amplifier, short-circuiting the output of said operational amplifier to the inverting terminal of said operational amplifier to derive said compensating signal at the inverting terminal of said operational amplifier, and

wherein said compensating signal is stored in a capacitor with first electrode connected to said inverting terminal and second electrode of said capacitor connected to ground.

Claim 4. The DC offset compensation system as described in claim 3, wherein said operation amplifier constitutes one stage of an IF amplifier to amplify said IF signal.

Claim 5. The DC offset compensation system as described in claim 1, wherein said calibration signal is applied to the input of said radio receiver during said calibration phase.

Claim 6. The DC offset compensation system as described in claim 1, further comprising a low noise amplifier (LNA) at the input of said receiver before the mixer.

Claim 7. The DC offset compensation system as described in claim 6, wherein said calibration signal is applied before the mixer.

Claim 8. The DC offset compensation system as described in claim 1, wherein said calibration signal is applied at the output of said mixer.

Claim 9. The DC offset compensation system as described in claim 1, wherein said calibration signal is a DC voltage.

Claim 10. The DC offset compensation system as described in claim 9, wherein said DC voltage is zero.

Claim 11. The DC offset compensation system as described in claim 1, wherein said calibration signal is an AC calibration signal without superimposed DC voltage, and a low-pass filter is used to remove the AC component of the calibration signal.

Claim 12. The DC offset compensation system as described in claim 11, wherein said calibration signal has the same frequency as the LO signal.

Claim 13. The DC offset compensation system as described in claim 1, wherein said local oscillator generates a in-phase LO signal and a quadrature LO signal, which mix with incoming RF signal in an in-phase mixer and a quadrature mixer, respectively, and to generate in-phase said IF signal and quadrature said IF signal, respectively.

Claim 14. The DC offset compensation system as described in claim 1, wherein said system also compensates for 1/f noise in the IF signal.

Claim 15. The DC offset compensation system as described in claim 1, further comprising more than one said compensation signal applied to more than one stage of the IF amplifier.